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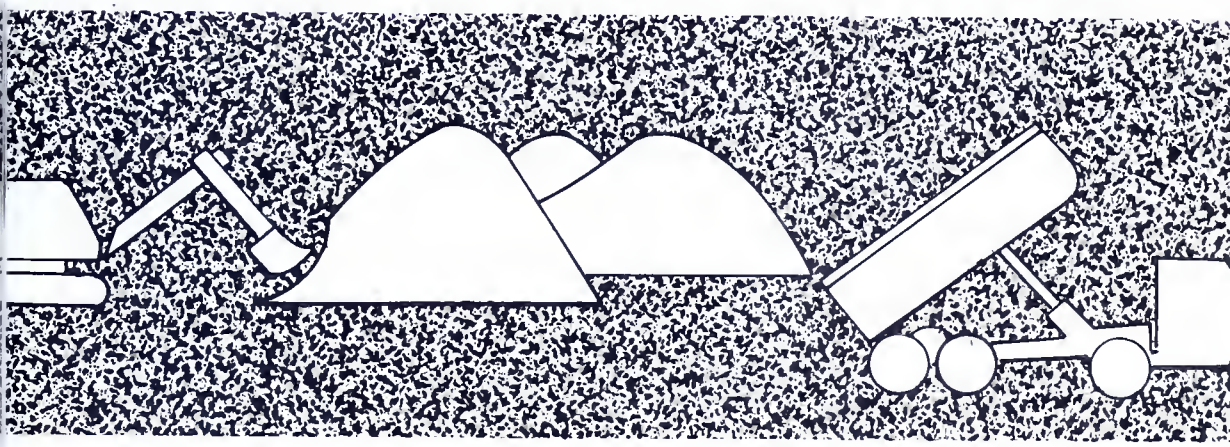
The Mineral Industry of Pennsylvania in 1969

C. Gordon Leaf



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, State Geologist

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BUREAU OF MINES MINERALS YEARBOOK

The Mineral Industry of Pennsylvania

UNITED STATES DEPARTMENT OF THE INTERIOR

UNITED STATES DEPARTMENT OF THE INTERIOR ● Rogers C. B. Morton, Secretary

BUREAU OF MINES ● Elburt F. Osborn, Director

This publication is a chapter from the current Bureau of Mines Minerals Yearbook, comprising *Volume I–II, Metals, Minerals, and Fuels; Volume III, Area Reports: Domestic; Volume IV, Area Reports: International.* Individual chapters from all volumes and the separate volumes of the Yearbook sold by the Superintendent of Documents, Washington, D.C. 20402.

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The Mineral Industry of Pennsylvania

This chapter has been prepared under a cooperative agreement between the Bureau of Mines, U.S. Department of the Interior, and the Pennsylvania Bureau of Topographic and Geologic Survey for collecting information on all minerals except fuels.

By C. Gordon Leaf [1]

The value of mineral production in Pennsylvania in 1969 increased 8 percent over that of 1968 to a total of $976 million. Bituminous coal production accounted for 73 percent of the increase with a total value increase of $53 million. Anthracite production decreased 1.0 million tons, continuing its downward trend for the seventh consecutive year, but the total value increased by $3.5 million because of a $1.14 per ton price increase. Collectively, anthracite and bituminous coal production accounted for 58 percent of the total mineral production value in 1969. Stone production continued to rise with an increase in value of $10 million. Other commodities showing an increase in value were portland cement, clays, lime, crude petroleum, sand and gravel, peat, zinc, pyrites, and tripoli. Commodities with decreases in total value were masonry cement, copper, natural gas, natural gas liquids, kaolin, cobalt, gold and silver, iron ore, mica, and sericite schist.

Leading producing counties, with primary commodities in parentheses, were Washington (bituminous coal), Greene (bituminous coal), Northampton (cement), Allegheny, Cambria, Indiana, Armstrong (bituminous coal), and Schuylkill (anthracite).

[1] Geologist, Bureau of Mines, Pittsburgh, Pa.

Table 1.—Mineral production in Pennsylvania [1]

Mineral	1968		1969	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Cement:				
Portland—thousand 376-pound barrels	43,018	$123,176	44,893	$126,941
Masonry—thousand 280-pound barrels	3,151	8,706	3,085	8,504
Clays [2]—thousand short tons	3,034	17,679	2,727	19,637
Coal:				
Anthracite—do	11,461	97,245	10,473	100,770
Bituminous—do	76,200	408,982	78,631	461,579
Copper—short tons	4,850	4,059	3,382	3,215
Gem stones	NA	4	NA	4
Lime—thousand short tons	1,702	24,272	2,008	28,952
Natural gas—million cubic feet	87,987	24,460	79,134	21,841
Natural gas liquids:				
Natural gasoline and cycle products—thousand 42-gallon barrels	27	73	22	61
LP gases—do	37	95	35	78
Peat—short tons	35,806	385	34,613	407
Petroleum (crude)—thousand 42-gallon barrels	4,160	18,698	4,448	20,086
Sand and gravel—thousand short tons	18,101	31,076	18,105	31,451
Stone—do	62,812	108,151	66,992	117,726
Zinc [3] (recoverable content of ores, etc.)—short tons	30,382	8,203	33,035	9,646
Value of items that cannot be disclosed: Clays (kaolin), cobalt, gold, iron ore, mica, pyrites, sericite-schist, silver, and tripoli	XX	28,780	XX	25,470
Total	XX	904,044	XX	976,368
Total 1967 constant dollars	XX	894,270	XX	p 916,415

p Preliminary. NA Not available. XX Not applicable.

[1] Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

[2] Excludes kaolin; included with "Value of items that cannot be disclosed."

[3] Recoverable zinc valued at the yearly price of prime western slab zinc, East St. Louis market. Represents value established after transportation, smelting, and manufacturing charges have been added to the value of ore at the mine.

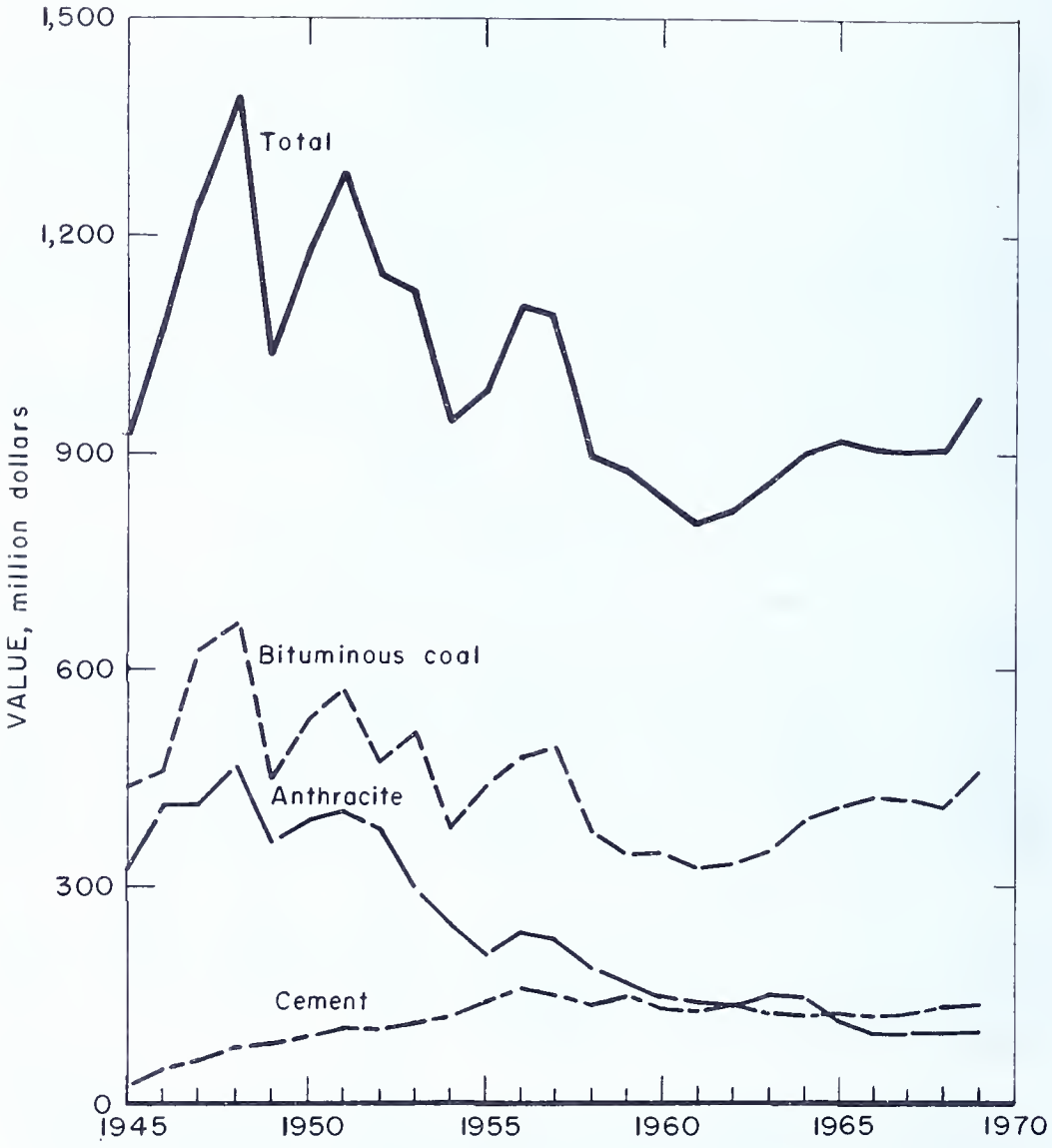

Figure 1.—Value of bituminous coal, anthracite, cement, and total value of mineral production in Pennsylvania.

Table 2.—Value of mineral production in Pennsylvania, by counties [1,2]

(Thousands)

County	1968	1969	Minerals produced in 1969 in order of value
Adams	W	W	Stone, lime, clays, sericite-schist.
Allegheny [3]	$31,463	$34,646	Coal, cement, clays, sand and gravel, stone, iron ore (pigment material).
Armstrong	32,746	42,098	Coal, clays, sand and gravel, stone.
Beaver	3,647	3,420	Sand and gravel, coal, clays.
Bedford	W	W	Stone, coal, lime, sand and gravel.
Berks	W	W	Iron ore, cement, stone, clays, cobalt, coal, sand and gravel, pyrites.
Blair	W	2,138	Stone, coal.
Bradford	W	W	Sand and gravel.
Bucks	W	12,376	Stone, sand and gravel, clays.
Butler [4]	11,741	12,694	Coal, cement, stone, lime, sand and gravel.
Cambria	W	W	Coal, clays, stone, iron ore (pigment material).
Carbon	5,714	5,459	Coal, stone, sand and gravel.
Centre	18,117	21,808	Lime, stone, coal, clays.
Chester	W	W	Stone, lime, clays.
Clarion	11,264	17,143	Coal, stone, sand and gravel, clays.
Clearfield	27,605	27,564	Coal, clays.
Clinton	W	W	Coal, stone, clays.
Columbia	3,164	3,982	Coal, stone, sand and gravel, peat, lime.
Crawford	458	537	Sand and gravel.
Cumberland	W	3,021	Stone, sand and gravel, clays.
Dauphin	3,511	3,253	Stone, sand and gravel, coal, clays.
Delaware	W	W	Stone.
Elk	W	W	Coal, stone.
Erie	W	W	Sand and gravel, peat.
Fayette	6,809	7,578	Coal, stone, clays.
Forest	W	461	Sand and gravel.
Franklin	1,658	1,581	Stone, sand and gravel.
Fulton	W	W	Do.
Greene	80,454	89,313	Coal.
Huntingdon	W	W	Sand and gravel, stone, coal, clays.
Indiana	W	W	Coal, clays.
Jefferson	W	W	Coal, clays, stone.
Lackawanna	W	W	Coal, sand and gravel.
Lancaster	7,416	10,794	Stone, coal, clays, sand and gravel.
Lawrence	W	W	Cement, stone, coal, sand and gravel, clays, peat.
Lebanon	23,565	23,850	Iron ore, lime, stone, copper, cobalt, pyrites, gold, silver.
Lehigh	30,875	34,654	Cement, zinc, stone.
Luzerne	36,264	37,769	Coal, stone, sand and gravel, peat, clays.
Lycoming	W	W	Stone, sand and gravel, coal, tripoli.
McKean	284	217	Clays, stone.
Mercer	1,405	2,166	Sand and gravel, coal, stone, peat.
Mifflin	W	W	Sand and gravel, stone, lime.
Monroe	826	869	Stone, sand and gravel, clays.
Montgomery	W	W	Stone, cement, lime, clays.
Montour	W	W	Stone, lime.
Northampton	63,071	60,824	Cement, stone, sand and gravel.
Northumberland	W	W	Coal, clays, stone.
Perry	W	W	Stone.
Philadelphia	W	------	
Potter	108	107	Stone.
Schuylkill	39,140	41,241	Coal, stone, sand and gravel.
Snyder	518	398	Sand and gravel, stone, coal.
Somerset	18,111	23,911	Coal, stone, clays.
Sullivan	200	160	Coal.
Susquehanna	W	W	Stone.
Tioga	W	W	Coal, sand and gravel.
Union	W	W	Stone.
Venango	W	W	Coal, sand and gravel, stone.
Warren	988	396	Sand and gravel.
Washington	W	W	Coal, stone, clays.
Wayne	800	682	Sand and gravel, stone, peat.
Westmoreland	22,441	W	Coal, sand and gravel, stone.
Wyoming	W	1,322	Sand and gravel, stone.
York [4]	9,891	10,226	Cement, stone, lime, clays, sand and gravel, mica.
Undistributed	409,792	436,868	
Total [5]	904,044	976,368	

W Withheld to avoid disclosing individual company confidential data; included with "Undistributed."

[1] Cameron, Juniata, and Pike Counties are not listed because no production was reported.

[2] Values of natural gas, natural gasoline, LP gases, petroleum, and gem stones unspecified by counties, included with "Undistributed."

[3] Excludes cement; included with "Undistributed."

[4] Excludes cement and lime; included with "Undistributed."

[5] Data may not add to totals shown because of independent rounding.

Table 3.—Indicators of Pennsylvania business activity

		1968	1969	Change, percent
Employment and labor force, annual average: [1]				
Total labor force	thousands	r 4,912.3	5,013.2	+2.1
Unemployment	percent of work force	3.2	2.9	−9.4
Employment:				
Manufacturing	thousands	r 1,564.7	1,580.9	+1.0
Durable goods	do	r 928.7	940.2	+1.2
Lumber and wood products	do	r 14.7	14.5	−1.4
Furniture and fixtures	do	29.1	29.8	+2.4
Stone, clay, and glass products	do	r 64.1	66.7	+4.1
Primary metals	do	r 254.0	253.0	−.4
Fabricated metal products	do	r 113.1	116.3	+2.8
Nonelectrical machinery	do	r 139.4	141.7	+1.6
Electrical equipment	do	r 158.8	160.9	+1.3
Transportation equipment	do	r 75.4	77.9	+3.3
Instruments	do	38.3	38.7	+1.0
Nondurable goods	do	r 636.0	640.6	+.7
Food products	do	r 114.2	114.6	+.4
Apparel and related products	do	r 180.9	182.4	+.8
Paper products	do	r 45.9	48.7	+6.1
Printing	do	r 71.3	69.5	−2.5
Chemical products	do	r 61.8	63.0	+1.9
Nonmanufacturing	do	r 2,694.8	2,788.8	+3.5
Mining	do	r 38.1	38.9	+2.1
Contract construction	do	r 193.5	203.1	+5.0
Personal income: [2]				
Total	millions	r $40,102	p $43,243	+7.8
Per capita		$3,413	p $3,664	+7.4
Construction activity:				
New residential [3]	thousands	$573.8	$563.4	−1.8
New nonresidential [3]	do	$977.1	$1,214.9	+24.3
Cement shipments to and within Pennsylvania [4]	thousand 376-pound barrels	r 19,972	19,901	−.4
Mineral production [4]	millions	$904	$976	+8.0

p Preliminary. r Revised.
[1] Pennsylvania Bureau of Employment Security.
[2] Survey of Current Business.
[3] Pennsylvania Department of Labor and Industry.
[4] U.S. Bureau of Mines.

Table 4.—Worktime and injury experience in the mineral industries

Year and industry	Average men working daily	Days active	Man-days worked (thousands)	Man-hours worked (thousands)	Number of injuries: Fatal	Number of injuries: Nonfatal	Injury rates per million man-hours: Frequency	Injury rates per million man-hours: Severity
1968:								
Bituminous coal	22,002	231	5,073	40,603	30	897	22.83	6,089
Anthracite	6,932	217	1,508	11,011	4	504	46.13	4,182
Metal	1,473	299	441	3,538	1	32	9.33	2,124
Nonmetal	1,442	252	364	2,954	1	103	35.21	6,028
Sand and gravel	1,236	239	296	2,488	-----	70	28.14	3,421
Stone	8,403	270	2,268	18,549	3	281	15.31	1,661
Peat	50	230	12	91	-----	1	10.98	44
Total [1]	41,538	240	9,961	79,234	39	1,888	24.32	4,517
1969: p								
Bituminous coal	21,300	244	5,184	41,511	26	1,010	24.96	5,583
Anthracite	6,300	221	1,399	10,156	13	440	44.60	9,586
Metal	1,385	290	419	3,348	1	29	8.96	2,044
Nonmetal	1,255	252	318	2,578	1	73	28.71	5,307
Sand and gravel	1,125	250	282	2,426	-----	55	22.67	739
Stone	8,460	278	2,352	18,692	2	296	15.94	1,706
Peat	56	232	13	106	-----	1	9.43	160
Total [1]	39,895	249	9,967	78,817	43	1,904	24.70	4,864

p Preliminary.
[1] Data may not add to totals shown because of independent rounding.

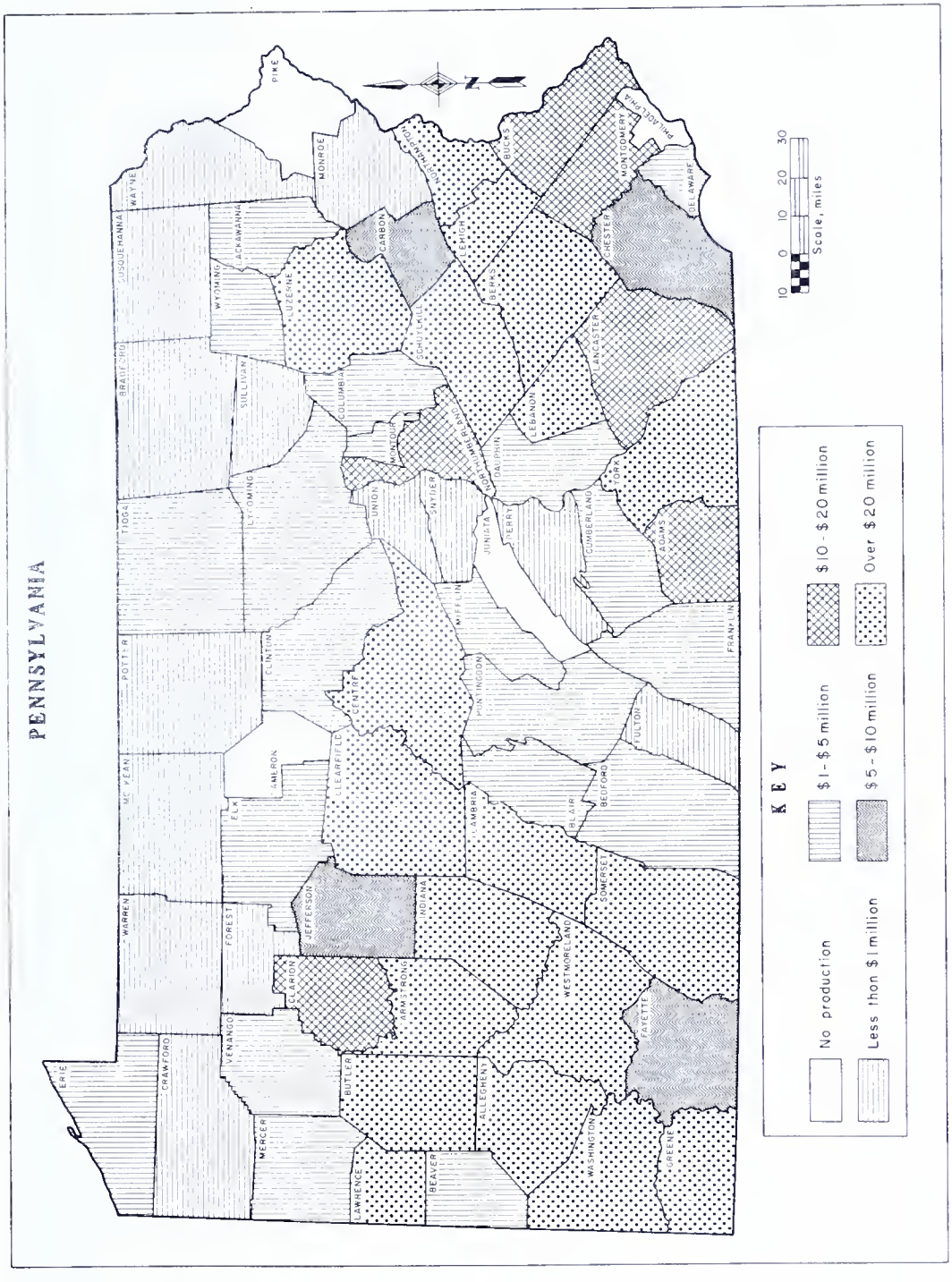

Figure 2.—Change in value of county mineral production from 1968.

REVIEW BY MINERAL COMMODITIES

MINERAL FUELS

Coal (Anthracite).—Anthracite production decreased for the seventh consecutive year and reached a new modern-day low of 10.5 million tons in 1969. Production has steadily decreased since 1917 when a peak of 100 million tons was reached.

The total value of anthracite production increased 4 percent to $101 million. This was an increase of $1.14 per short ton over 1968 value. Truck and rail shipments of Pennsylvania anthracite to other States totaled 2.6 million tons, shipments to Canada totaled 373,000 tons, and shipments to other foreign countries totaled 853,000 tons.

Of the total production, 9.9 million tons was processed from preparation plants, 535,000 tons from river dredging, and 17,000 tons was used at collieries for power and heat; 5.6 million tons was shipped by truck and 4.9 million tons by rail.

Underground mine production accounted for 2.1 million tons or 20 percent of the total production. Of this, 1.3 million tons was mechanically loaded by 106 scraper loaders, 25 mobile loaders, and 158 conveyor and pit-car loaders (including duckbills and other self-loading conveyors). Fresh-mined anthracite produced from strip pits totaled 4.6 million tons, which was 44 percent of the total production. The Lehigh Region produced 1.6 million tons of this strip coal, 2.0 million tons came from the Schuylkill Region, and 0.9 million tons came from the Wyoming Region. Equipment used to recover coal from culm banks and strip pits included 104 power shovels and 165 draglines. Of the 3.3 million tons of anthracite produced from culm banks (31 percent of the total production), 1.8 million tons came from the Schuylkill Region, 0.8 million tons came from the Lehigh Region, and 0.7 million tons came from the Wyoming Region. Five hundred and thirty-five thousand tons of anthracite was produced by dredging (5 percent of the total production). Of this total, 483,000 tons came from the Susquehanna River with an average value of $4.33 per ton and 53,000 tons from the Schuylkill River with an average value of $3.50 per ton. Anthracite (from all sources) shipped by rail had an average value of $9.11 per ton, $10.07 per ton by truck, and $11.23 per ton for colliery fuel.

The anthracite industry averaged 221 days worked during the year with an average of 6,300 men working daily (632 men less than in 1968). Of the average number of men working daily, 1,529 worked underground, 1,718 in strip pits, 548 at culm banks, 1,612 at preparation plants, 62 on dredges, and 831 at other surface jobs. Productivity from all operations except dredges averaged 7.24 tons per man-day, while dredges averaged 31.56 tons per man-day for an overall average of 7.53 tons per man-day (0.09 ton per man-day less than in 1968).

Eleven counties produced anthracite during 1969. Schuylkill County was the leading producer for the second consecutive year and produced 4.1 million tons. Following Schuylkill County were Luzerne (3.4 million tons), Northumberland (1.3 million tons), and Carbon, Lancaster, Lackawanna, Columbia, Dauphin, Berks, Sullivan, and Snyder, all with less than half a million tons.

Thirteen work deaths were reported for the year, more than 3 times the total for 1968. The fatalities were as follow: Roof falls (one), underground haulage (one), gas or dust explosion (one), haulage on surface (one), strip mines (three), haulage at mechanical cleaning plants (one), machinery at mechanical cleaning plants (one), and all other (four). The frequency rate of fatalities increased from 0.36 million man-hours worked in 1968 to 1.28 million man-hours in 1969. Nonfatal lost-time injuries dropped from 504 in 1968 to 440 in 1969, and the frequency rate dropped from 45.77 injuries per million man-hours of exposure to 43.32 in 1969.

Coal (Bituminous).—Production of bituminous coal totaled 78.6 million tons with a value of $462 million, compared with 76.2 million tons valued at $409 million in 1968. This represents a 3-percent increase in production and a 13-percent increase in value. The average price per ton increased from $5.37 in 1968 to $5.87 in 1969. Open-market sales of 49.7 million tons averaged $4.89 per ton, and the 28.9 million tons not sold on the open market (captive) averaged $7.56 per ton. Of the 78.6 million

tons produced, 57.8 million tons was shipped by rail or water, 15.5 million tons by truck, and the remainder by other means. Unit-train shipments totaled 20 million tons, 2 million more than in 1968.

Eight hundred and thirty mines operated in Pennsylvania in 1969, including 228 underground mines, a decrease of 33 from 1968; 541 strip mines, an increase of 52; and 61 auger mines, 6 more than in 1968. Of the total production, 56.0 million tons (71 percent) came from underground mines, 22.0 million tons (28 percent) came from strip mines, and 622,000 tons (1 percent) came from auger mines.

Of the total output, 65 percent was mechanically cleaned at 77 preparation plants. Of the cleaned coal, 43.9 million tons came from underground mines, 6.8 million tons came from strip mines, and 61,000 tons came from auger mines. Wet washing methods, other than by jig washers, were used to clean 30.4 million tons; 12.2 million tons was cleaned in jig washers, and 8.1 million tons was cleaned by pneumatic methods. Thermal drying of 4.5 million tons of coal was done at 10 plants in 11 thermal units.

A total of 37.3 million tons of coal was crushed at 163 plants. Forty-two plants treated 8.9 million tons with oil, 1.6 million tons with a combination of calcium chloride and oil, and 665,000 tons wih calcium chloride.

Mechanical loading was practiced at 171 underground mines loading 55.8 million tons. The 108 mobile loading machines accounted for 8.4 million tons, 45.2 million tons was cut and loaded by 458 continuous mining machines. An additional 79 mobile loading machines were used with the continuous mining machines. Nine longwall machines loaded 2.0 million tons. The balance of the mechanical loading was by duckbills, scraper loaders, and hand-loaded face conveyors.

There were 209 cutting machines cutting 8.8 million tons of underground coal, and 160 hand-held and post-mounted drills, which drilled 1.8 million tons. Thirty-five mobile drills drilled 7.0 million tons. Three hundred and four rotary drills and 273 percussion drills were used for roof bolting. Miscellaneous drilling functions were performed with 50 other drills.

Underground haulage was by 970 trolley locomotives, 45 battery-powered locomotives, and 4 other locomotives. There were 431 miles of main-line track and 237 miles of working-section track. In addition 574 motor belt conveyors each averaging 1,896 feet carried large tonnages. Other haulage was accomplished by 1,008 cable-reel and 26 battery shuttle cars, plus 12 shuttle buggies.

Strip mining equipment included 570 power shovels, 20 fewer than in 1968, and 315 draglines, 23 fewer than in 1968. Most of the shovels and draglines were diesel-powered with a dipper capacity of less than 3 cubic yards. Only 10 draglines had a dipper capacity of over 12 cubic yards. There were 28 carryall scrapers (one less than in 1968), 7 of which had a dipper capacity of over 12 cubic yards. Other equipment included 652 bulldozers, 46 horizontal and 134 vertical drills, and 1,010 trucks which averaged 17 tons in capacity and traveled an average distance of 7 miles from pit to tipple.

Auger mining equipment included 55 augers, 9 bulldozers, and 5 horizontal and 2 vertical drills. Seventy-one trucks, which averaged 16 tons in capacity, traveled an average distance of 8 miles from pit to tipple.

Washington County led in coal production with 13.8 million tons, followed by Greene (12.1 million tons), Indiana (8.1 million tons), Armstrong (7.4 million tons), and Cambria (7.1 million tons). Greene and Washington Counties accounted for most of the captive coal produced in Pennsylvania.

During the year, 26 fatal and 1,010 nonfatal lost-time injuries occurred. This was a decrease of 4 fatal injuries, but an increase of 113 nonfatal injuries. Injury rates were 0.63 fatal and 24.33 nonfatal per million man-hours of exposure and 0.33 fatal and 12.84 nonfatal per million short tons mined. Eighteen of the fatal injuries occurred underground (10 from rock falls, two on transportation, three on machinery, two from electricity, and one from miscellaneous causes), one at a mechanical cleaning plant, two on transportation outside the mine, and five in strip mines.

In the 1969 National Safety Competition, Certificates of Achievement in Safety for outstanding safety records in the Underground-Coal Group were awarded to the Harman No. 5 mine, Harman Coal Corp., Timblin, Pa., for 63,674 man-hours worked

without a disabling work injury; Kinseley No. 10 mine, Kinseley Coal Co., Reynoldsville, Pa., for 38,610 man-hours worked; and Penn Hill No. 2 mine, Penn Hill Coal Co., Clymer, Pa., for 36,096 man-hours worked. A Certificate of Achievement in Safety in the Surface-Coal Group was awarded to Simca Mining No. 2 mine, Simca Mining, Inc., Curwensville, Pa., for 31,547 man-hours worked without a disabling work injury.

Natural Gas Liquids.—Production of natural gas liquids decreased 11 percent to 57,000 42-gallon barrels. Of the total, 22,000 barrels was natural gasoline and cycle products and 35,000 barrels was liquefied petroleum (LP) gases and ethane from natural gas processing plants. LP gases and ethane averaged $2.23 per barrel ($2.56 in 1968), and natural gasoline and cycle products averaged $2.77 per barrel ($2.70 in 1968). According to the Oil and Gas Journal, proved reserves of natural gas liquids totaled 1 million barrels at yearend 1969.

Peat.—Production of peat increased 3 percent. Ten operations in seven counties reported production of 39,600 short tons. Sales totaled 34,600 tons. The average price per ton ($11.76) was $1.02 more than that for 1968. Of the total output, more than one-half was humus peat; the remainder was reed sedge and moss peat. Most of the peat produced was shredded for preparation prior to marketing.

For the third straight year Luzerne County was the State's leading producer with 42 percent of the total production; other peat-producing counties were Wayne, Lackawanna, Erie, Columbia, Lawrence, and Mercer.

Petroleum and Natural Gas.—Production of crude petroleum increased 7 percent as a result of new water-flood projects in the Bradford field. Penn-grade crude petroleum production totaled 4.4 million 42-gallon barrels valued at $20 million, with an additional 45,000 barrels of Corning-grade crude oil, valued at $132,750, produced in Crawford and Erie Counties from the Medina (Lower Silurian) Sandstone. The number of producing oil wells decreased from 42,500 in 1968 to 37,625 in 1969. Estimated proved recoverable reserves of crude oil at yearend totaled 54.7 million barrels, a decrease of 4.5 million barrels from that of yearend 1968.

Natural gas production totaled 79 billion cubic feet (Bcf), a decrease of 10 percent from that of 1968. A total of 61.3 Bcf of

Table 5.—Coal (bituminous) production, by counties

County	Number of mines				Production (thousand tons)	Average price per ton
	Underground	Strip	Auger	Total		
Allegheny	9	12	---	21	4,808	$6.86
Armstrong	22	41	11	74	7,399	4.73
Beaver	W	5	W	W	267	4.61
Bedford	W	W	---	W	16	5.19
Blair	1	---	---	1	2	6.76
Butler	W	30	W	W	2,098	4.23
Cambria	40	24	1	65	7,066	6.60
Centre	2	20	---	22	1,050	3.99
Clarion	---	66	---	66	3,771	4.38
Clearfield	15	55	9	79	5,919	4.05
Clinton	---	16	---	16	551	4.46
Elk	4	10	7	21	367	4.41
Fayette	3	34	1	38	778	5.19
Greene	19	4	---	23	12,076	7.45
Huntingdon	---	W	---	W	W	W
Indiana	39	29	12	80	8,070	5.67
Jefferson	10	38	8	56	1,440	4.49
Lawrence	---	21	1	22	848	3.80
Lycoming	---	3	---	3	50	3.65
Mercer	---	4	---	4	182	4.02
Somerset	30	70	6	106	4,254	4.90
Tioga	---	8	---	8	743	4.19
Venango	---	12	---	12	504	3.70
Washington	12	18	---	30	13,769	6.90
Westmoreland	10	16	2	28	2,593	6.52
Other counties	12	5	3	55	10	4.30
Total	228	541	61	830	78,631	5.87

W Withheld to avoid disclosing individual company confidential data.

gas was produced from the shallow (Upper Devonian or younger) reservoirs, while production from the deep (Oriskany or older) reservoirs totaled 17.8 Bcf. The estimated number of producing gas wells decreased from 17,000 in 1968 to 16,600 in 1969. Estimated proved reserves of natural gas totaled 1,304 Bcf, including 499 Bcf in storage at yearend. This was a decrease of 41 Bcf from that of 1968.

The Oil and Gas Division, Pennsylvania Bureau of Topographic and Geologic Survey, reported 986 new wells drilled and 47 wells deepened during 1969. Of these, 539 were oil wells, 249 gas wells, 122 service wells, 15 miscellaneous wells, one stratigraphic test, and 60 dry holes. Of the old wells drilled deeper, 26 were gas wells, nine were oil wells, and 12 were dry. Total footage of all wells drilled was 1,930,944. Of 895 well completions, 42 were exploratory (31 percent successful), and 853 were development (95 percent successful).

Deep drilling (Middle Devonian or older) increased from 39 wells in 1968 to 43 wells in 1969. Most of the deep development drilling was in the Medina gas area of Crawford County, where 13 gas wells were drilled in the Indian Springs field. Activity in the shallow gasfields was in Indiana, Jefferson, and Armstrong Counties, where development continued in the Big Run and Marchand fields. Shallow oil drilling was carried on in the Bradford field of McKean County in the Bradford and associated sandstones. One hundred and twenty-one oil wells were drilled in the Red Valley and Venango Second sand areas of Venango and Forest Counties. Warren County was again the most active oil area, with 234 successful wells completed in 1969.

Indiana County continued to be the most active gas area, with 121 successful wells completed. Seismic crews put in 39 crew-weeks during the year compared with 23 crew-weeks in 1968. A tract of 1,100 acres of State Forest land was leased through competitive bidding at $8.17 per acre. A total bonus of $8,987 was received for this tract, which carries a yearly rental of $1 per acre. At yearend there were 144,983 acres of State Forest lands under lease for oil and gas exploration and development, including 59,109 acres in gas storage. A total of 785 acres of State Game land was leased during 1969. At yearend, 24 leases were active, totaling 13,613 acres. There are 35 productive wells on 18 leases of State Game lands.

NONMETALS

Cement.—Shipments of portland cement increased 4 percent, with the average value per 376-pound barrel decreasing $0.03 to $2.83. Masonry cement shipments decreased 2 percent, with the average value per 280-pound barrel remaining at $2.76. Finished portland cement was produced at 22 plants which had a total annual production capacity of 51.7 million barrels, an increase of 500,000 barrels from that of 1968. Twenty plants shipped masonry cement during 1969.

For cement surveys, Pennsylvania is divided into two districts. Eastern and western Pennsylvania are separated by a line running south from the Pennsylvania-New York State line along the eastern boundaries of Potter, Clinton, Centre, Huntingdon, and Franklin Counties. Portland cement shipments from the five plants in western Pennsylvania totaled 12.0 million barrels at an average price of $3.17 per barrel, of which 93 percent was types I and II (general use and moderate heat), 3 percent was type III (high-early-strength), and 1 percent was portland-pozzolan. Of the total shipments from western Pennsylvania, 10.3 million barrels was shipped by truck in bulk, 837,000 barrels by truck in containers, 738,000 barrels by railroad in bulk, and 32,000 barrels by railroad in containers.

Portland cement shipments of all types from 17 plants in eastern Pennsylvania totaled 32.9 million barrels at an average price of $2.70 per barrel, of which 90 percent was types I and II, 6 percent type III, and 2 percent white cement. Of the total shipments from eastern Pennsylvania, 20.9 million barrels was by truck in bulk, 7.7 million barrels by railroad in bulk, 3.6 million barrels by truck in containers, and the remainder by railroad in containers.

Of the 11.7 million barrels of portland cement produced in western Pennsylvania, 3.3 million barrels was air-entrained; of 31.5 million barrels produced in eastern Pennsylvania, 4.8 million barrels was air-entrained. Portland cement stocks at yearend totaled 1.7 million barrels in western Pennsylvania and 2.4 million barrels in eastern Pennsylvania.

Ready-mixed concrete companies purchased 19.1 million barrels of portland cement shipped from eastern Pennsylvania and 7.9 million barrels from western Pennsylvania; concrete products manufacturers purchased 8.1 million barrels from the east and 1.4 million barrels from the west; building material dealers purchased 3.2 million barrels from the east and 880,000 barrels from the west; and highway contractors purchased 2.0 million barrels from the east and 1.2 million barrels from the west.

Limestone and cement rock were the chief raw materials used for the manufacture of portland cement; 9.2 million tons was consumed in eastern Pennsylvania, and 3.1 million tons was used in western Pennsylvania. Other raw materials used included shale, clay, sand, slag, gypsum, iron ore, bauxite, and mill scale. Eastern Pennsylvania purchased 742 million kilowatt-hours of electricity, and western plants bought 316 million kilowatt-hours.

Prepared masonry cement shipped from 15 plants in eastern Pennsylvania totaled 2.0 million barrels at an average price of $2.67 per barrel. Shipments from five plants in western Pennsylvania totaled 1.1 million barrels at $2.92 per barrel.

The leading portland cement shipping county was Northampton, with 41 percent of the State's total shipments, followed by Lehigh County. Other counties shipping portland cement were Allegheny, Butler, and Lawrence in the west, and Berks, Montgomery, and York in the east. Northampton County also led in shipments of masonry cement with 26 percent of the total.

The United States is the only major cement-producing nation in the world which still uses the 376-pound barrel as a major unit of measure for cement. During 1969, Canadian companies abandoned their own 350-pound barrel and adopted the 2000-pound short ton as their standard unit of cement measure.

Clays.—Total production of clays (excluding kaolin) decreased 10 percent in tonnage. A higher unit value resulted in an increase of 11 percent in value. Fire clay, which decreased 15 percent in tonnage and increased 14 percent in value, accounted for 44 percent of total production. Common clay and shale, decreasing 6 percent in tonnage and increasing 6 percent in value, accounted for the remaining 56 percent of the total. Clay was produced in 28 counties, led by Clearfield and Lawrence.

Gem Stones.—Hobbyists and amateur lapidarists collected mineral specimens.

Graphite.—Manufacturing of artificial graphite in Pennsylvania in 1969 was carried on at three plants in Elk and Northampton Counties. The output, in the form of anodes, electric motor brushes and brush stock, and other items, was produced from petroleum coke, lampblack, pitch cokes, hydrocarbon gases, and other raw materials.

Gypsum.—A gypsum-calcining plant continued operations at Philadelphia.

Table 6.—Clays sold or used by producers, by kinds and uses [1]

(Thousand short tons)

Use	Fire clay		Miscellaneous clay	
	1968	1969	1968	1969
Refractories:				
Firebrick and block	681	665	-----	-----
High-alumina brick	15	W	-----	-----
Other	[2] 91	[2] 98	W	W
Heavy clay products:				
Building brick	585	393	1,223	1,177
Vitrified sewer pipe	45	W	67	64
Undistributed	[3] 7	[3] 50	[4] 319	[4] 279
Total	1,424	1,206	[5] 1,610	1,520

W Withheld to avoid disclosing individual company confidential data.

[1] Excludes kaolin.

[2] Includes mortar, clay crucibles (1968), foundries and steelworks (bulk), and other refractories.

[3] Includes other heavy clay products (1968), pottery, floor and wall tile, portland and other hydraulic cements, and other uses (1969).

[4] Includes other heavy clay products, drain tile, exports (1968), pottery (1968), floor and wall tile (1968), lightweight aggregate, filler, foundries and steelworks (bulk), mortar (1969), portland and other hydraulic cements, and other uses.

[5] Data may not add to totals shown because of independent rounding.

Iron Oxide Pigments.—Red iron oxide pigments were recovered during plant processing of bauxite to alumina in Allegheny County. Yellow iron oxide pigments in the form of sulfur mud were mined from an open pit in Cambria County. Finished natural and manufactured iron oxide pigments were shipped from one plant in Carbon County and two plants in Northampton County.

Lime.—Lime production (quicklime and hydrated lime) increased 18 percent in tonnage and 19 percent in value over 1968. Production of quicklime increased from 1.4 million tons in 1968 to 1.7 million tons; hydrated lime increased from 284,000 tons in 1968 to 312,000 tons. The average price per ton of quicklime increased from $13.90 to $14.07, while that of hydrated lime increased from $16.02 to $16.29 per ton. The chemical industry and other industrial markets consumed most of the quicklime sold, with the remainder distributed among construction, agricultural, and refractory markets. Of the total hydrated lime sold or used, 44 percent was consumed by the chemical and other industrial markets, with the remainder distributed among agricultural and construction markets. Thirteen plants were operated in 11 counties. Of the 13 plants, six sold both quicklime and hydrated lime, four sold only quicklime, one sold only hydrated lime, one plant used only quicklime, and one plant sold or used both quicklime and hydrated lime.

Centre County again led in production, with three large plants each producing quicklime and hydrated lime. They accounted for 46 percent of the total quicklime sold and used, 24 percent of the hydrated lime sold and used, and 39 percent of the total lime value. Sixty-three percent of the total lime sold and used was consumed in Pennsylvania, 15 percent in Maryland, 7 percent in New Jersey, 4 percent in New York, and 4 percent in Ohio.

Mica.—Residual mica was produced and processed near Glenville in York County. The processed mica was used in paint, roofing, grease, electric insulation, welding rods, rubber, and textile coating.

Perlite (Expanded).—Crude perlite from Colorado was expanded at one plant each in Allegheny, Delaware, Lehigh, Luzerne, Montgomery, Philadelphia, and York Counties. Expanded perlite was sold or used chiefly for building plaster, with other uses being loose fill insulation, concrete aggregate, filler, soil conditioning, filter, cryogenic applications, charbase, refractory, and material for castable insulation and bonding mortars.

Pyrites.—Pyrite was recovered by flotation in the milling process for magnetic iron ore at the Grace and Cornwall concentrators in Berks and Lebanon Counties. The concentrate was shipped for consumption to the Bethlehem Steel Corporation sulfuric acid plant at Sparrows Point, Md.

Sand and Gravel.—Sand and gravel production remained at about the 1968 level although the total value increased 1 percent. Commercial sand production totaling 10.5 million tons sold for an average value of $1.84 per ton. Building, paving, and fill accounted for 82 percent of the commercial sand use with the remainder being used for other construction purposes and for industrial sand. Industrial uses included glass, molding, grinding and polishing, blast, fire or furnace, engine, abrasives, chemical, filler, foundry uses, pottery, porcelain, tile, and other uses. Commercial gravel production totaling 7.6 million tons sold for an average value of $1.59 per ton. Building construction used 48 percent, paving construction 46 percent, and fill, railroad ballast, and miscellaneous uses accounted for the remainder. Seventy percent of the commercial sand and gravel production was shipped by truck; the remaining 30 percent was shipped by railroad and waterway. Commercial sand and gravel plants included 87 stationary, 11 portable, and 4 dredges.

Sand and gravel was produced in 37 counties. Bucks County led the State in production with 20 percent of the total commercial tonnage and 19 percent of the value. Other leading producers were Westmoreland, Erie, Beaver, Wyoming, and Armstrong Counties.

Stone.—Production of stone increased 7 percent and the value of production increased 9 percent from that of 1968. The principal factor contributing to the stimulated mineral activity was the increase (24.3 percent) in nonresidential construction.

Of the total stone production, 66.9 million tons was crushed or broken. Increased production was reported for all types of

Table 7.—Sand and gravel sold or used by producers, by classes of operations and uses
(Thousand short tons and thousand dollars)

Class of operation and use	1968		1969	
	Quantity	Value	Quantity	Value
Commercial operations:				
Sand:				
Molding	142	$421	542	$869
Building	5,420	8,296	5,094	7,811
Paving	3,433	5,343	3,443	5,473
Fire or furnace	50	171	38	132
Fill	28	38	89	138
Undistributed [1]	1,313	4,725	1,279	4,920
Total	10,386	18,994	[2] 10,487	[2] 19,342
Gravel:				
Building	3,599	5,921	3,630	5,900
Paving	3,367	5,324	3,476	5,714
Fill	373	214	330	227
Undistributed [3]	286	386	183	266
Total	7,625	11,845	7,619	[2] 12,108
Total sand and gravel	18,011	30,839	[2] 18,105	[2] 31,451
Government-and-contractor operations:				
Sand: Other	67	171	------	------
Gravel:				
Paving	3	7	------	------
Other	20	59	------	------
Total	23	66	------	------
Total sand and gravel	90	237	------	------
All operations:				
Sand	10,453	19,165	10,487	19,342
Gravel	7,648	11,911	7,619	12,108
Grand total	18,101	31,076	[2] 18,105	[2] 31,451

[1] Includes glass, grinding and polishing, blast, engine, filtration (1968), hydrafrac (1969), ground, and other sand.
[2] Data may not add to totals shown because of independent rounding.
[3] Includes railroad ballast, miscellaneous, and other gravel.

crushed stone except basalt, slate, and oystershell. Sixty-four percent of the crushed stone was used as aggregate, 17 percent for cement manufacture, 8 percent for furnace flux, 5 percent for lime manufacture, 2 percent for agricultural purposes, and the remainder for stone sand, railroad ballast, dust abatement in coal mines, riprap, refractory, and other uses.

All types of dimension stone except those classified as miscellaneous stone decreased in production in 1969. Production decreased 15 percent in tonnage and 3 percent in total value from that of 1968. Slate production accounted for 33 percent of the dimension stone tonnage and 62 percent of its value, while sandstone and quartzite accounted for 48 percent of the tonnage but less than 24 percent of the value.

The leading type of stone produced was limestone and dolomite comprising 85 percent of the tonnage and 77 percent of the total value.

Fifty-one counties reported stone production from 231 crushed-stone and 49 dimension-stone quarries. Leading counties in production were Montgomery, Northampton, Lancaster, Bucks, York, Adams, Berks, Centre, Chester, and Lawrence.

Some of the operations receiving Certificates of Achievement for safety in the 1969 National Safety Competition, Quarry Group, were Millard Quarry, Bethlehem Mines Corp., Annville, Pa., for 485,840 man-hours worked without a disabling work injury; Hanover Quarry, Bethlehem Steel Corp., Hanover, Pa., for 396,460 man-hours worked; McCoy Quarry, Bethlehem Mines Corp., Bridgeport, Pa., for 211,168 man-hours worked; Hillsville Quarry, Eastern Limestone Operation, Hillsville, Pa., for 205,117 man-hours worked; Charmian Quarry, GAF Corp. (Industrial Products Div.), Blue Ridge Summit, Pa., for 174,428 man-hours worked; Bessemer Quarry, Bessemer Ce-

ment Co., Bessemer, Pa., for 128,508 man-hours worked; Bethlehem Quarry, Bethlehem Mines Corp., Bethlehem, Pa., for 128,065 man-hours worked; and Valley Forge-Catanach Quarry, Martin-Marietta Corp. (Appalachian Stone Div.), Malvern, Pa., for 104,119 man-hours worked without a disabling work injury.

Table 8.—Stone sold or used by producers, by uses

(Thousand short tons and thousand dollars)

Use	1968		1969	
	Quantity	Value	Quantity	Value
Dimension stone:				
Building stone	75	$1,361	72	$1,781
Curbing and flagging	34	1,091	22	754
Other uses [1]	40	4,009	31	3,759
Total	[2] 148	[2] 6,460	125	6,294
Crushed and broken stone:				
Riprap	160	203	132	192
Construction aggregates [3]	37,649	55,506	42,581	65,932
Furnace flux (limestone)	5,316	10,828	5,075	9,740
Railroad ballast	702	1,067	576	987
Agricultural	1,490	4,080	1,423	3,776
Other uses [4]	17,347	30,005	17,079	30,804
Total	62,664	[2] 101,690	66,866	[2] 111,432
Grand total	62,812	[2] 108,151	[2] 66,992	[2] 117,726

[1] Includes monumental, surface plates, refractory blocks, roofing slate, and millstock.
[2] Data may not add to totals shown because of independent rounding.
[3] Includes dense-graded road base stone and concrete, bituminous, macadam, and surface treatment aggregates; and unspecified construction aggregate and roadstone (1969).
[4] Includes cement and lime manufacture, refractory, filler, chemical, and other uses.

Table 9.—Stone sold or used by producers, by counties

(Thousand short tons and thousand dollars)

Counties	1968		1969	
	Quantity	Value	Quantity	Value
Armstrong	412	$886	226	$483
Berks	4,173	5,169	3,883	5,345
Blair	1,700	2,078	1,221	2,123
Bucks	3,432	5,026	4,351	6,312
Butler	2,082	3,707	1,684	3,640
Centre	3,483	5,564	3,809	6,268
Chester	2,540	4,544	3,251	5,722
Clinton	W	W	607	854
Cumberland	1,370	2,211	1,414	2,337
Dauphin	W	W	1,348	2,152
Huntingdon	W	2,202	W	1,283
Lancaster	3,338	4,606	4,712	7,742
Lawrence	W	W	3,217	4,260
Lebanon	2,142	3,677	2,388	4,165
Lehigh	W	W	2,564	3,010
Luzerne	W	W	575	878
McKean	W	W	W	30
Mercer	W	W	277	W
Mifflin	W	W	W	462
Montgomery	5,330	9,119	5,423	9,446
Northampton	W	W	5,417	10,453
Northumberland	87	248	260	407
Potter	W	W	3	107
Schuylkill	W	W	W	701
Somerset	W	W	961	2,253
Venango	5	22	W	W
Westmoreland	W	W	1,527	2,775
York	3,945	8,732	4,121	8,953
Undistributed [1]	28,779	50,358	13,754	25,565
Total	[2] 62,812	[2] 108,151	[2] 66,992	117,726

W Withheld to avoid disclosing individual company confidential data.
[1] Includes Adams, Allegheny, Bedford, Cambria, Carbon, Clarion, Columbia, Delaware, Elk, Fayette, Franklin, Fulton, Jefferson, Lycoming, Monroe, Montour, Perry, Snyder, Susquehanna, Union, Washington, Wayne, and Wyoming Counties and data indicated by symbol W.
[2] Data may not add to totals shown because of independent rounding.

Sulfur.—Sulfur and hydrogen sulfide were recovered in liquid purification of oil refinery gases at four refineries in two counties. Four refineries recovered sulfur and one recovered hydrogen sulfide, which was converted directly into sulfuric acid. One of the refineries in Delaware County, formerly Sinclair Oil Corp., was changed to BP Oil Corp., a subsidiary of British Petroleum Corp. Ltd.

Talc (Sericite-Schist).—Sericite-schist, which resembles talc mineralogically and is suitable for many of the same uses because of similar chemical and physical properties, was produced from an open pit and processed near Aspers, Adams County. The schist was used as an asphalt filler and as an ingredient in insecticides, joint cement, and enamel coating.

Tripoli (Rottenstone).—Two operations in Lycoming County produced tripoli. One operation near Muncy prepared the material for use as a filler. The other operation near Oriole processed the material by drying, crushing, and grinding in Raymond Roller Mills, and used it as an abrasive and as a filler.

Vermiculite (Exfoliated).—Two operations, one each in Bucks and Lawrence Counties, produced exfoliated vermiculite in 1969. The major use was for insulation. Other uses included plaster aggregate, concrete aggregate, soil conditioning, horticulture, and fire base.

METALS

Cobalt.—Cobalt was recovered as a byproduct of pyrite concentrate produced from the mining and flotation of magnetite in Berks and Lebanon Counties. The cobalt content decreased by 15 percent.

Copper, Gold, and Silver.—Copper concentrate production decreased 30 percent in tonnage and 21 percent in value. The concentrate was recovered by flotation of magnetic iron ore from the Cornwall mine in Lebanon County. The concentrate contained gold and silver, both of which decreased considerably in quantity and value.

Three sites in Lancaster County that were once mining scenes of colonial days were receiving attention for their potential as sources of silver. According to a report in Skillings Mining Review, the three areas of interest are the old Bamford mine, a few miles west of Lancaster, near Landisville; the old Pequea mine, a few miles east of the Conestoga River on Silver Mine Road; and an old limestone quarry north of Gap. Interest was revived in the area when Dr. Jacob Freedman of the geology department of Franklin and Marshall College, Lancaster, working for the U.S. Geological Survey, made a geochemical study of the area beginning in 1966 and found highly concentrated areas of lead and zinc.

Iron Ore.—Usable iron ore production and shipments decreased 10 percent in tonnage and 11 percent in value. Magnetite, produced from the Cornwall and Grace underground mines in Lebanon and Berks Counties, was crushed, concentrated by magnetic separation, and pelletized at agglomerating plants at the mine sites. Most of the iron ore pellets were shipped to company-owned iron and steel plants.

Iron and Steel.—Pig iron production totaled 22.3 million tons in 1969, 6 percent higher than the previous year. Most of the pig iron produced (95 percent) was classed as basic. The remaining 5 percent was Bessemer, malleable, and direct castings.

Forty-four blast furnaces were active during the year (one less than in 1968), and 14 furnaces were idle.

Iron ore consumption totaled 23.5 million tons; 53 percent in agglomerating plants, 43 percent in blast furnaces, and the remainder in steel furnaces. Receipts of iron ore totaled 24.9 million tons, 65 percent of which came from foreign countries and 35 percent from domestic sources. At the beginning of 1969 iron ore stocks were 11.1 million tons and at yearend they were 9.8 million tons. The iron and steel industry consumed 2.9 million tons of dolomite, 2.8 million tons of limestone, and 1.6 million tons of other fluxes. Other materials consumed included 14.1 million tons of coke, 1.8 million tons of steel furnace slag, 1.5 million tons of mill cinder and roll scale, 0.9 million tons of raw flue dust, and 0.5 million tons of coke breeze. Steel furnaces consumed 21.5 million tons of pig iron and hot metal and 11.3 million tons of home and purchased scrap. Blast furnaces consumed 1.0 million tons of home and purchased scrap and 0.1 million tons of slag scrap. Agglomerates consumed in blast furnaces included 11.9 million tons of sinter (self-fluxing), 5.3 million tons of iron ore pellets (regular), 4.5 million tons of U.S. sinter (regular), and 2.8 million tons of foreign iron ore and other agglom-

erates. Blast furnaces produced 178,000 tons of scrap, 6.8 million tons of slag, and recovered 798,000 tons of flue dust.

Zinc.—Zinc ore was mined and processed in Lehigh County. Mine output of zinc was 9 percent more than that of 1968, based on the quantity of recoverable zinc metal. The value of production increased 18 percent. Zinc ore concentrates were shipped to the New Jersey Zinc Company smelter at Palmerton. Products from the smelter included rolled zinc, slab zinc, zinc diecasting alloys, dry-battery shells, zinc oxide, spiegeleisen, and cadmium.

Table 10.—Principal producers

Commodity and company	Address	Type of activity	County
Abrasives:			
Nonmetallic: Satellite Alloy Corp.	9800 McKnight Rd. Pittsburgh, Pa. 15237	Plant	Allegheny.
Metallic:			
Abrasive Metals Co.	26th & B. & O. RR Pittsburgh, Pa. 15222	do.	Do.
Durasteel Abrasive Co.	2601 Smallman St. Pittsburgh, Pa. 15222	do.	Westmoreland.
Industeel Corp.	37th & A. V. RR Pittsburgh, Pa. 15222	do.	Allegheny.
Pangborn Div., the Carborundum Co.	P.O. Box 380 Hagerstown, Md. 21740	do.	Butler.
Cement:			
Allentown Portland Cement Co.[1]	7th St. at Thruway Allentown, Pa. 18101	do.	Berks.
Allentown Portland Cement Co.	do.	do.	Montgomery.
Bessemer Cement Co., subsidiary of Louisville Cement Co.	510 Hanna Bldg. Cleveland, Ohio 44115	do.	Lawrence.
Coplay Cement Manufacturing Co.[1]	North 2d St. Coplay, Pa. 18037	do.	Lehigh.
Do.	Easton Rd. Coplay, Pa. 18037	do.	Northampton.
Dragon Cement Co., div. of Martin-Marietta Corp.[1]	5A Joyce Kilmer Ave. New Brunswick, N.J. 08903	do.	Do.
Giant Portland Cement Co.[1]	1500 Chestnut St. Philadelphia, Pa. 19102	do.	Lehigh.
Green Bag Cement Co., div. of Marquette Cement Manufacturing Co.	20 North Wacker Dr. Chicago, Ill. 60606	do.	Allegheny.
Hercules Cement Co., div. of American Cement Corp.[1]	555 City Line Ave. Bala-Cynwyd, Pa. 19004	do.	Northampton.
Keystone Portland Cement Co.[1]	1400 South Penn Sq. Philadelphia, Pa. 19102	do.	Do.
Lehigh Portland Cement Co.[1]	718 Hamilton St. Allentown, Pa. 18105	do.	Lehigh.
Lone Star Cement Corp.[1]	P.O. Box 6237 West End Br. Richmond, Va. 23230	do.	Northampton.
Medusa Portland Cement Co.[2]	P.O. Box 5668 Cleveland, Ohio 44101	do.	Lawrence.
Medusa Portland Cement Co.[3,4]	do.	do.	York.
National Portland Cement Co.[1]	1023 West St. George Ave. Linden, N.J. 07036	do.	Northampton.
Penn-Dixie Cement Corp.[5]	P.O. Box 152 Nazareth, Pa. 18064	do.	Butler.
Penn-Dixie Cement Corp.[1]	do.	do.	Northampton.
Universal Atlas Cement Div., U.S. Steel Corp.	Chatham Center Pittsburgh, Pa. 15230	do.	Allegheny.
Universal Atlas Cement Div., U.S. Steel Corp.[1]	do.	do.	Northampton.
The Whitehall Cement Manufacturing Co.[1]	123 South Broad St. Philadelphia, Pa. 19109	do.	Lehigh.
Clay and shale:			
Fire:			
Drexel Refractories Div., Drexel Dynamics Corp.	P.O. Box 50 Kittanning, Pa. 16201	Underground	Armstrong.
Eastvale-Standard Clay Products Co.[4]	Box 681 Beaver Falls, Pa. 15010	do.	Beaver.
Freeport Brick Co.	Drawer F Freeport, Pa. 16229	do.	Armstrong.
Freeport Brick Co., Kittanning Brick Div.	R.D. 1 Adrian, Pa. 16210	do.	Do.
Hanley Co.	28 Kennedy St. Bradford, Pa. 16701	do.	Jefferson.
Harbison Walker Refractories Co.	2 Gateway Center Pittsburgh, Pa. 15222	do.	Armstrong.
Do.	do.	Pit	Cambria, Centre, Clearfield, Fayette, Somerset.

See footnotes at end of table.

Table 10.—Principal producers—Continued

Commodity and company	Address	Type of activity	County
Clay and shale—Continued			
Fire—Continued			
Ralph A. Veon, Inc.	Darlington, Pa. 16115	Pit	Lawrence.
Kaolin: The Philadelphia Clay Co	236 West North St. Carlisle, Pa. 17013	Pit	Cumberland.
Common clay and shale:			
Alwine Brick Co., subsidiary of Glen-Gery Corp.	New Oxford, Pa. 17350	Pit	Adams.
Bylite Corp	P.O. Box 1628, North End Station Wilkes-Barre, Pa. 18705	Pit	Luzerne.
Fenati Brick Co., Inc.	New Castle, Pa. 16101	Pit	Lawrence.
Glen-Gery Corp	227 North 5th St. Reading, Pa. 19601	Pit	Berks, Dauphin, Lancaster, Northumberland, York.
Hanley Co	28 Kennedy St. Bradford, Pa. 16701	Pit	McKean.
McAvoy Vitrified Brick Co	Phoenixville, Pa. 19460	Pit	Chester.
McQuiston Coal Co. [5]	109 East Moody Ave. New Castle, Pa. 16101	Pit	Lawrence.
Milliken Brick Co., Inc. [4]	2100 Montier St. Pittsburgh, Pa. 15221	Pit	Allegheny.
The Robinson Clay Product Co.	65 West State St. Akron, Ohio 44309	Pit	Montgomery.
Coal:			
Anthracite:			
Blue Coal Corp. [4]	101 South Main St. Ashley, Pa. 18706	Underground	Luzerne.
Blue Coal Corp. [7]	do	Culm bank	Do.
Blue Coal Corp. [8]	do	Strip	Do.
Carbondale Coal Co., Inc. [4]	78 Cottage St. Carbondale, Pa. 18407	do	Lackawanna.
Gangloff Brothers [4]	New Ringgold, Pa. 17960	Culm bank	Northumberland.
Glen-Nan Coal Co., Inc	St. Mary's and River Road Wilkes-Barre, Pa. 18702	Underground	Luzerne.
Greenwood Stripping Corp	1 Venice St. Nesquehoning, Pa. 18240	Strip	Carbon, Schuylkill.
Jeddo-Highland Coal Co. [8]	800 Exeter Ave. West Pittston, Pa. 18643	do	Luzerne.
Jeddo-Highland Coal Co. [4]	do	Culm bank	Do.
Kerris & Helfrick, Inc	Lehigh & Popular St. Mount Carmel, Pa. 18751	Strip	Columbia, Northumberland, Schuylkill.
Lehigh Valley Anthracite, Inc	800 Exeter Ave. West Pittston, Pa. 18643	Culm bank	Carbon, Schuylkill, Luzerne.
Do	do	Strip	Columbia, Luzerne, Schuylkill.
Pennsylvania Power & Light Co.	901 Hamilton St. Allentown, Pa. 18101	Dredge	Lancaster.
Ken Pollock, Inc. [4]	Route 11 Hunlock Creek, Pa. 18621	Culm bank	Luzerne.
Reading Anthracite Co	200 Mahantongo St. Pottsville, Pa. 17901	do	Northumberland, Schuylkill.
Do	do	Strip	Do.
Bituminous:			
Barnes & Tucker Co	357 Lancaster Ave. Haverford, Pa. 19041	Underground	Cambria, Indiana.
Bethlehem Mines Corp	701 East 3d St. Bethlehem, Pa. 18016	do	Cambria, Washington.
Buckeye Coal Co	P.O. Box 900 Youngstown, Ohio 44501	do	Greene.
Gateway Coal Co. for J & L	Box 608 California, Pa. 15419	do	Do.
Harmar Coal Co. [4]	Box 500 Library, Pa. 15129	do	Allegheny.
Jones & Laughlin Steel Corp	Box 608 California, Pa. 15419	do	Greene.
Mathies Coal Co	Box 500 Library, Pa. 15129	do	Washington.
Pittsburgh Coal Co. [4]	do	do	Do.
United States Steel Corp	525 Wm. Penn Pl. Pittsburgh, Pa. 15219	do	Greene, Washington.
Graphite (synthetic):			
Airco Speer Carbon Products, div. of Air Reduction Co., Inc.	Theresia St. St. Marys, Pa. 15857	Plant	Elk.
Chas. Pfizer & Co., Inc., MPM Division.	235 East 42d St. New York, N.Y. 10017	do	Northampton.
Stackpole Carbon Co	St. Marys, Pa. 15857	do	Elk.

See footnotes at end of table.

Table 10.—Principal producers—Continued

Commodity and company	Address	Type of activity	County
Gypsum (calcined): United States Gypsum Co. [9]	101 South Wacker Dr. Chicago, Ill. 60606	Plant	Philadelphia.
Iron ore:			
Bethlehem Mines Corp. [10]	701 East 3d St. Bethlehem, Pa. 18016	Underground	Berks.
Bethlehem Mines Corp. [11]	----do----	----do----	Lebanon.
Iron oxide pigments:			
Crude:			
Allegheny Ludlum Steel Corp	2000 Oliver Bldg. Pittsburgh, Pa. 15222	Plant	Allegheny.
Lanzendorfer Minerals Co	Twin Rocks, Pa. 15960	Pit	Cambria.
Finished:			
Minerals, Pigments, & Metals Div., Chas. Pfizer & Co., Inc.	640 North 13th St. Easton, Pa. 18042	Plant	Northampton.
The Prince Manufacturing Co.	Bowmanstown, Pa. 18030	----do----	Carbon.
Reichard-Coulston, Inc	15 East 26th St. New York, N.Y. 10010	----do----	Northampton.
Lime:			
The J. E. Baker Co. [1]	P.O. Box 1189 York, Pa. 17405	----do----	York.
Mercer Lime & Stone Co	1640 Oliver Bldg. Pittsburgh, Pa. 15222	----do----	Butler.
National Gypsum Co. [1]	325 Delaware Ave. Buffalo, N.Y. 14202	----do----	Centre.
Standard Lime & Refrac. Co., div. Martin-Marietta Corp. [1]	2000 First National Bank Bldg. Baltimore, Md. 21203	----do----	Do.
Warner Company [1]	1721 Arch St. Philadelphia, Pa. 19103	----do----	Do.
Do	----do----	----do----	Chester.
Mica (crude): Micalith Mining Co., Inc.	P.O. Box 1671 Phoenix, Arizona 85001	Pit	York.
Peat:			
Benton Peat	Benton, Pa. 17814	Bog	Columbia.
Blue Ridge Industries, Inc	Box 128, R.D. 2 White Haven, Pa. 18661	Bog	Luzerne.
D. M. Boyd Co	226 Francis St. New Wilmington, Pa. 16142	Bog	Mercer.
Corry Peat Products Co	515 West Columbus Ave. Corry, Pa. 16407	Bog	Erie.
International Peat, Inc	R.D. 1 White Haven, Pa. 18661	Bog	Luzerne.
Lake Benton Peat Moss	1418 North Main St. Scranton, Pa. 18508	Bog	Lackawanna.
Pennsylvania Peat Moss, Inc	21st & Laurel Sts. Hazleton, Pa. 18201	Bog	Luzerne.
Stillers Blue Ridge Peat Co	R.D. White Haven, Pa. 18661	Bog	Do.
Wayne Peat Humus Co., Inc	P.O. Box 315 Gouldsboro, Pa. 18424	Bog	Wayne.
Welker's Greenhouse, Inc	New Castle, Pa. 16101	Bog	Lawrence.
Perlite (expanded):			
C-E Refractories	Port Kennedy, Pa. 19463	Plant	Montgomery.
The Celotex Corp	1500 North Dale Mabry Tampa, Fla. 33607	----do----	Luzerne.
Insul-Fil Manufacturing Co	Box 325 Primos, Pa. 19018	----do----	Delaware.
Pennsylvania Perlite Corp	P.O. Box 2002 Lehigh Valley, Pa. 18001	----do----	Lehigh, York.
Perlite Manufacturing Co	P.O. Box 478 Carnegie, Pa. 15106	----do----	Allegheny.
Petroleum refineries:			
Atlantic Richfield Co	260 South Broad St. Philadelphia, Pa. 19102	----do----	Philadelphia.
Franklin Refinery, div. of Sonneborn Sons, Inc.	Franklin, Pa. 16323	----do----	Venango.
Gulf Oil Corp	P.O. Box 7408 Philadelphia, Pa. 19101	----do----	Erie.
Kendall Refining Co., div. of Witco Chemical Co.	Bradford, Pa. 16701	----do----	McKean.
Pennsylvania Refining Co	Karns City, Pa. 16041	----do----	Butler.
Pennzoil Company	Oil City, Pa. 16301	----do----	Venango.
Quaker State Oil Refining Corp	Farmers Valley, Pa. 16749	----do----	McKean, Venango.
Sinclair Oil Corp	600 Fifth Ave. New York, N.Y. 10001	----do----	Delaware.
Sun Oil Company	1608 Walnut St. Philadelphia, Pa. 19101	----do----	Do.
United Refining Co	Warren, Pa. 16365	----do----	Warren.
Valvoline Oil Co., div. of Ashland Oil and Refining Co.	Freedom, Pa. 15042	----do----	Beaver.
Wolf's Head Oil Refining Co., Inc	Reno, Pa. 16343	----do----	Venango.

See footnotes at end of table.

Table 10.—Principal producers—Continued

Commodity and company	Address	Type of activity	County
Sand and gravel:			
Davison Sand & Gravel Co	34th Ave. & 4th St. New Kensington, Pa. 15068	Dredge	Westmoreland.
East Falls Sand & Gravel	R.D. 1 Falls, Pa. 18615	Pit	Wyoming.
Emlenton Limestone Co., Inc	Box 67 Emlenton, Pa. 16373	Pit	Armstrong.
Erie Sand Steamship Co	Erie, Pa. 16500	Dredge	Erie.
Glacial Sand & Gravel Co	P.O. Box 10 Kittanning, Pa. 16201	Pit	Armstrong, Clarion.
Lycoming Silica Sand Co	401 Broad St., Box 159 Montoursville, Pa. 17754	Pit	Lycoming.
Manorville Sand Co	Box 251 Manorville, Pa. 16238	Pit	Armstrong.
Mount Cydonia Sand Co., Inc	R.D. 1 Fayetteville, Pa. 17222	Pit	Franklin.
Pennsylvania Glass Sand Corp	Berkeley Springs, W. Va. 25411	Pit	Huntingdon, Mifflin.
Penray Supply, Inc	1001 Paxton St. Harrisburg, Pa. 17104	Pit	Dauphin.
Seidle Sand & Gravel, Inc	R.D. 4 Mercer, Pa. 16137	Pit	Mercer.
State Aggregates Inc	635 Lucknow Lane Harrisburg, Pa. 17110	Pit	Bradford.
Tionesta Sand & Gravel Inc	Hawthorne, Pa. 16230	Pit	Forest.
Warner Company	1721 Arch St. Philadelphia, Pa. 19103	Pit	Bucks.
Wyoming Sand & Stone Co	Falls, Pa. 18615	Pit	Wyoming.
Smelters (zinc):			
The New Jersey Zinc Co	Palmerton, Pa. 18071	Plant	Carbon.
St. Joseph Lead Co	Josephtown, Pa. 15081	do	Beaver.
Stone:			
Limestone and dolomite—crushed:			
Appalachian Stone Div., Martin-Marietta Corp.	Box 120 Mercersburg, Pa. 17236	Quarry	Centre, Chester, Fayette, Franklin.
Bethlehem Mines Corp. [12]	701 East 3d St. Bethlehem, Pa. 18016	do	Adams, Lebanon.
Bethlehem Mines Corp	do	do	Dauphin, Mifflin, Montgomery, Northampton.
Bradford Hills Quarries, Inc	Box 231 Easton, Pa. 18042	do	Chester, Lancaster, Montgomery, Perry.
G. & W. H. Corson, Inc. [13]	Plymouth Meeting, Pa. 13462	do	Montgomery.
Eureka Stone Quarry, Inc	Lower State and Bristol-Chertown Rds. Eureka, Pa. 18914	do	Bucks.
Eastern Industries Inc	Box 188 Wescosville, Pa. 18090	do	Berks, Lehigh.
Lycoming Silica Sand Co	P.O. Box 159 Montoursville, Pa. 17754	do	Clinton, Columbia, Lycoming, Montour.
National Gypsum Co	325 Delaware Ave. Buffalo, N.Y. 14202	do	York.
New Enterprise Stone & Lime	New Enterprise, Pa. 16664	do	Bedford, Blair, Franklin, Huntingdon.
United States Steel Corp	Hillsville, Pa. 16132	do	Lawrence.
Miscellaneous—crushed and broken:			
Better Materials Corp	Route 232 & Swamp Rd. Penns Park, Pa. 18943	do	Bucks.
Gill Quarries, Inc	P.O. Box 187 Fairview Village, Pa. 19434	do	Bucks, Montgomery.
M & M Stone Co	Harleysville, Pa. 19438	do	Do.
Miscellaneous—dimension:			
Burdo & Burdo	29 Washington Ave. Belmont Heights Philadelphia, Pa. 19100	do	Do.
F. Cantono & Sons	454 Germantown Pike Lafayette Hill, Pa. 19444	do	Delaware.
Di Bonaventura Quarries, Inc	4989 West Thompson St. Philadelphia, Pa. 19131	do	Do.
Oystershell—crushed: Reading Poultry Food Co.	Orrton & Noble Sts. Reading, Pa. 19600	Plant	Berks.

See footnotes at end of table.

Table 10.—Principal producers—Continued

Commodity and company	Address	Type of activity	County
Stone—Continued			
Sandstone and quartzite—crushed:			
Addy Asphalt Co	P.O. Box 1231 Wilkes-Barre, Pa. 18700	Quarry	Luzerne.
Commercial Stone Corp	P.O. Box 188 Belle Vernon, Pa. 15012	do	Fayette.
Coolbaugh Sand & Stone, Inc.	32 Railroad Ave. Scranton, Pa. 18505	do	Luzerne.
Detwilers Industries, Inc., subsidiary of New Enterprise Stone & Lime Co., Inc.	New Enterprise, Pa. 16664	do	Bedford, Somerset.
Eidemiller Enterprises, Inc	Greensburg, Pa. 15601	do	Westmoreland.
Harbison Walker Refractories Co.	2 Gateway Center Pittsburgh, Pa. 15219	do	Schuylkill.
Keeler Supply Co., Inc	Box 12 Clifford, Pa. 18413	do	Susquehanna.
Latrobe Construction Co	P.O. Box 150 Latrobe, Pa. 15650	Underground	Westmoreland.
North American Refractories Co.	6th Street Bldg. Cleveland, Ohio 44114	Quarry	Carbon, Huntingdon.
State Aggregates, Inc	635 Lucknow Lane Harrisburg, Pa. 17110	do	Susquehanna.
Summit Quarries, div. of J. Robert Bazley, Inc.	P.O. Box 298 Pottsville, Pa. 17901	do	Schuylkill.
Sandstoneandquartzite—dimension:			
Delaware Quarries	Lumberville, Pa. 18933	do	Bucks.
Firestone Products Co., Inc	300 Willow Grove Ave. Glenside, Pa. 19038	do	Montgomery.
Martin Stone Quarries	Box 157 Bechtelsville, Pa. 19505	do	Susquehanna.
Media Quarry Co	131 East 2d St. Media, Pa. 19063	do	Delaware.
Penn Kress Flagstone Co., Inc	Bridge St. Pittsburgh, Pa. 15209	do	Potter.
J. G. Robinson, Inc	P.O. Box 6 Fort Washington, Pa. 19034	do	Wyoming.
Paul Tompkins Estate	Hancock, N.Y. 13783	do	Wayne.
Valley Forge Building Stone	P.O. Box 195 Morgantown, Pa. 19543	do	Chester.
Slate—crushed:			
GAF Corp., Building, Industrial Floor Products Div.	140 West 51st St. New York, N.Y. 10020	do	York.
Pennsylvania Lightweight Aggregate, Inc.	Bangor, Pa. 18013	do	Northampton.
Slate—dimension:			
Capitol Slate Co., Inc	P.O. Box 281 East Bangor, Pa. 18040	do	Do.
Anthony Dally & Sons, Inc	Robinson Ave. Pen Argyl, Pa. 18072	do	Do.
Doney Slate Co	Pen Argyl, Pa. 18072	do	Do.
Emerald Slate Corp	Alpha Road Wind Gap, Pa. 18091	do	Do.
North Bangor Slate Co	Bangor, Pa. 18013	do	Do.
Penn Big Bed Slate Co., Inc.	446 Main St. Slatington, Pa. 18080	do	Lehigh.
Stephens-Jackson Co	Main St. & Schanck Ave. Pen Argyl, Pa. 18072	do	Northampton.
D. Stoddard & Sons, Inc	Bangor, Pa. 18013	do	Do.
Traprock (basalt)—crushed and broken:			
Bucks County Crushed Stone, Inc.	Ottsville, Pa. 18942	do	Bucks.
V. Di Francesco & Sons	17 Mifflin Ave. Havertown, Pa. 19083	do	Chester.
Do	do	do	Delaware.
GAF Corp., Building, Industrial & Floor Products Div.	140 West 51st St. New York, N.Y. 10020	do	Adams.
The General Crushed Stone Co.	712 Drake Bldg. Easton, Pa. 18042	do	Bucks, Delaware.
Vernon B. Horn	R.D. Chalfont, Pa. 18914	do	Bucks.
Kibblehouse Quarries, Inc	Perkiomenville, Pa. 18074	do	Montgomery.
Montgomery Stone Co., Inc. [14]	Montgomeryville, Pa. 18936	do	Do.
Pottstown Trap Rock Quarries, Inc.	R.D. 1 Douglasville, Pa. 19518	do	Berks, Montgomery.
Tohickon Quarry Co	Quakertown, Pa. 18951	do	Bucks.
Warner Company	1721 Arch St. Philadelphia, Pa. 19103	do	Berks.
Traprock (basalt)—dimension:			
Coopersburg Granite Co	Coopersburg, Pa. 18036	do	Do.
French Creek Granite Co	St. Peters, Pa. 19470	do	Chester.
Granite—crushed: Mignatti Constr. Co., Inc.	2310 Terwood Ave. Bethayres, Pa. 19006	do	Montgomery.
Granite—dimension: Carl Galantino, Inc.	42 Hirst Ave. East Lansdowne, Pa. 19050	do	Delaware.

See footnotes at end of table.

Table 10.—Principal producers—Continued

Commodity and company	Address	Type of activity	County
Sulfur:			
Atlantic Richfield Co	3144 Passyunk Ave. Philadelphia, Pa. 19145	Plant	Philadelphia.
Gulf Oil Corp	P.O. Box 7408 Philadelphia, Pa. 19101	----do	Do.
B P Oil Corp., subsidiary of British Petroleum Corp. Ltd.	P.O. Box 428 Marcus Hook, Pa. 19061	----do	Delaware.
Sun Oil Co	1608 Walnut St. Philadelphia, Pa. 19103	----do	Do.
Talc (sericite-schist): Summit Industries, Inc.	Drawer C Aspers, Pa. 17304	Pit	Adams.
Tripoli (rottenstone):			
Keystone Filler & Manufacturing Co.	Muncy, Pa. 17756	Pit	Lycoming.
Penn Paint & Filler Co	Antes Fort, Pa. 17720	Pit	Do.
Vermiculite (exfoliated):			
Hyzer & Lewellen	P.O. Box 155 Southampton, Pa. 18966	Plant	Bucks.
W. R. Grace & Company, Zonolite Div.	62 Whittemore Ave. Cambridge, Mass. 02140	----do	Lawrence.
Zinc: The New Jersey Zinc Co. [1]	160 Front St. New York, N.Y. 10038	Underground	Lehigh.

[1] Also limestone.
[2] Also limestone and shale.
[3] Also limestone and clay.
[4] 2 operations.
[5] Also limestone and sand and gravel.
[6] Also fire clay.
[7] 3 operations.
[8] 4 operations.
[9] Also expanded perlite.
[10] Also byproduct cobalt and pyrites.
[11] Also byproduct gold, silver, copper, cobalt, and pyrites.
[12] Also lime.
[13] Also cement and lime.
[14] Also dimension.